

ϕ	$\phi - \phi'$	Diff.	$\log. \rho$	Diff.
84° 0'	2' 26".87	24.20	9.9985341	50
85 0	2 2.67	24.35	5291	41
86 0	1 38.32	24.48	5250	32
87 0	1 13.84	24.56	5218	23
88 0	0 49.28	24.62	5195	13
89 0	0 24.66	24.66	5182	5
90 0	0 0.00		5177	

Meteors and Meteorology. By Richard A Proctor.

It will be in the knowledge of most of the Fellows of this Society that Erman long since maintained a meteoric theory in explanation of the so-called "cold days" which occur in February, April, and May. He believed that the cold which on the average of a great number of years is found to characterise those days is due to the existence of meteoric streams between the Earth and the Sun. He even held that the cold of February is due to the August meteor system, whose ascending node would have about the same heliocentric longitude as the Earth has at the middle of the February cold spell; while in like manner he associated the cold days of May with the November meteors. We now know that this part of his theory is mistaken. The ascending nodes of those two important meteor systems lie in the right heliocentric longitude; but, unfortunately for the theory, both meteor systems cross the plane of the ecliptic ascendingly far outside the Earth's orbit, so that she may throw her shadow on the meteors of those systems, but cannot possibly be shadowed by them.

I have been in the habit of regarding Erman's theory as probably erroneous altogether, though noting that it would have to be accepted if any evidence were obtained showing the whole Earth, and not Europe only, to undergo these periodical refrigerations. Mr. Russell, Government Observer at Sydney, has recently published evidence which seems to go a great way towards proving that this really is the case. In Australia and in America, it would seem, the average temperature of the cold days is lower than it should be if the seasonal rise from January to July were steadily maintained. He also quotes evidence obtained in Galileo's time, which shows that the same peculiarity was recognised in Europe more than two centuries and a half ago. That sometimes the fall of temperature must have been very marked is shown by the existence of popular proverbial expressions, doggerel verses, and so forth, in reference to these cold spells.

It seems to me, then, that we must revert to the meteoric theory, recognising in the existence of meteoric systems between

Jan. 1883.

Mr. Denning, *The Aquariads etc.*

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the Earth and Sun the explanation of the average fall of temperature,* while in the incompleteness of meteoric rings we find explanation of the frequent absence of all fall of temperature at these times; and in the great wealth of that part of such systems which has been poetically called the gem of the meteor ring we find an explanation of the intense cold often felt on the ill-omened days, such cold as to justify what has been said of the three April "cold days"—

The first of them is wan and weet,
The second it is cold and sleet,
The third it comes with sic a freeze
As gars the birds stick to the trees.

It would be of interest, I believe, to many if at those places where underground temperature is noted the average and also the actual temperatures for the cold days could be noted during many successive years. If meteoric shadow is in question, it is probable that the meteor systems, or at least those parts which cast the shadow, are near the Sun. If so, there might be some slight but discernible change in the solar spectrum on those days. If (as I trust) Dr. Huggins has really succeeded in securing photographs of the solar corona with the Sun uneclipsed, and if (as I believe) the outer coronal radiations are meteoric, we may be able before long to obtain more definite information on this question. It may even perhaps be shown that more extended meteorological relations depend on meteoric systems near the Sun, and that Sun-spots may be relieved of part of the imputations cast on them as weather-breeders. We might even find in meteoric periodicity near the Sun the explanation of Sun-spots themselves.

The Aquariads of April 29 to May 3 (Tupman, No. 33).

By W. F. Denning.

On April 30 and May 2-3, 1870, and again on April 29, 1871,† Col. Tupman observed a remarkably fine shower of meteors from points averaging $326^{\circ} - 2\frac{1}{2}^{\circ}$ near *a Aquarii*. The meteors were very brilliant, with streaks and long paths. This shower, being only visible for a short interval before sunrise, has received no good confirmation from subsequent observations. But it now appears that the recently published *Osservazioni di Stelle Cadenti fatte nelle stazioni Italiane durante gli anni 1868, 1869 e 1870*, in which are recorded the paths of 7602 shooting stars (chiefly

* It may be observed that in our almanacs no notice is taken of the peculiarity. It is treated as merely accidental, and the average temperatures are corrected (?) so as to rise and fall uniformly throughout the year. Buchan gives in his *Handy-book of Meteorology* a meteorological explanation which might hold but for Mr. Russell's evidence.

† There is some doubt as to the year in this case. In the B. A. Catalogue of Col. Tupman's observations it is given as 1871, but in the *Monthly Notices*, vol. xxxiii. p. 301, it is stated as 1869.